USER HANDBOOK

STERLING

SUB-MACHINE GUN

9-mm. MK 4

(S.M.G. 9mm. L.2.A.3.)

STERLING ARMAMENT COMPANY LIMITED

DAGENHAM ESSEX ENGLAND

CONTRACTORS TO MINISTRY OF DEFENCE, HER MAJESTY'S GOVERNMENT, CROWN AGENTS, AND OVERSEAS GOVERNMENTS.
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STERLING SUB-MACHINE GUN 9-mm. MK. 4.

Above: Shown with butt extended and bayonet fitted
Below: Shown folded

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SECTION 1—GENERAL

1.0 INTRODUCTION. The Sterling Sub-Machine Gun, Mark 4, is a light and easily handled weapon which will selectively fire automatically or single shot. Standard 9 mm Parabellum ammunition is used.

It is a short range weapon normally used for engagement at ranges up to 200 yards. It may be used at longer ranges dependant on the skill of the firer.

On account of its accuracy, lightness and reliability, the gun can be regarded as a general purpose weapon.

It is automatic, being operated by case reaction or " blow back " whether fired " single shot " or in bursts.

2.0 TECHNICAL DETAILS

Calibre	9 mm	9 mm
Length —butt folded	19 inches	48.2 cms
—butt extended	27 inches	69 cms
Weight—machine gun only	6 lbs (approx.)	2.7 Kg (approx.)
—with full magazine (34 rds)	7 lb 10 oz (approx.)	3.5 Kg (approx.)
—with full magazine and bayonet	8 lb 4 oz (approx.)	3.73 Kg (approx.)
Barrel —length	7.8 inches	19.8 cms
—number of grooves	6	
—pitch of rifling	1 turn in 9.84 inches	25 cms
—twist of rifling	Right hand	
Sights —radius	16.1 inches	41 cms
—type	Rear—aperture	
	Fore—blade	
—range settings	100 and 200 yards	100 and 200 metres
Cyclic rate of fire	550 r.p.m. approx.	

TERMINAL VELCCITY AND KINETIC ENERGY OF STANDARD 9 mm BULLET

RANGE		VELOCITY		KINETIC ENERGY	
Yards	Metres	Ft/Sec	M/Sec	Ft/lbs	Kgm
0	0	1280	390	447	62.2
109	100	1115	340	339	47.0
218	200	975	298	262	36.4
327	300	872	266	207	28.7
436	400	780	238	167	23.2
545	500	700	214	135	18.8
654	600	632	193	109	15.2
763	700	572	174	89	12.3
872	800	518	158	74	10.2

3.0 SPECIAL FEATURES

3.1 BUTT. When not in use the butt is folded under the weapon reducing the overall length by 9 inches. With the butt folded the weapon can be used as a pistol.

3.2 BODY. The forward part of the body, i.e. the barrel casing, is perforated to assist cooling. It will be found that even after prolonged firing the body remains comfortably cool. Finger guards are fitted at both ends of the barrel casing.

3.3 TRIGGER AND SAFETY MECHANISM. The trigger mechanism is fitted with a change lever which can be set to give either automatic fire or single shot. The change lever also has a SAFE position which locks the trigger and sear, irrespective of the position of the bolt, which eliminates the possibility of a round being fired if the weapon is dropped.

3.4 BACKSIGHT. The rear peephole sight is instantly changed from 100 to 200 yards range setting by rocking over.

3.5 BAYONET. The bayonet is mounted so that it is off-set when the weapon is in the firing position. It will be found that, when the weapon is held in the " on-guard " position for bayonet fighting, the natural balance of the weapon, with or without magazine, brings the bayonet into the upright position.

4.0 The weapon (*Fig.* 1) is operated by case reaction or " blow back ".

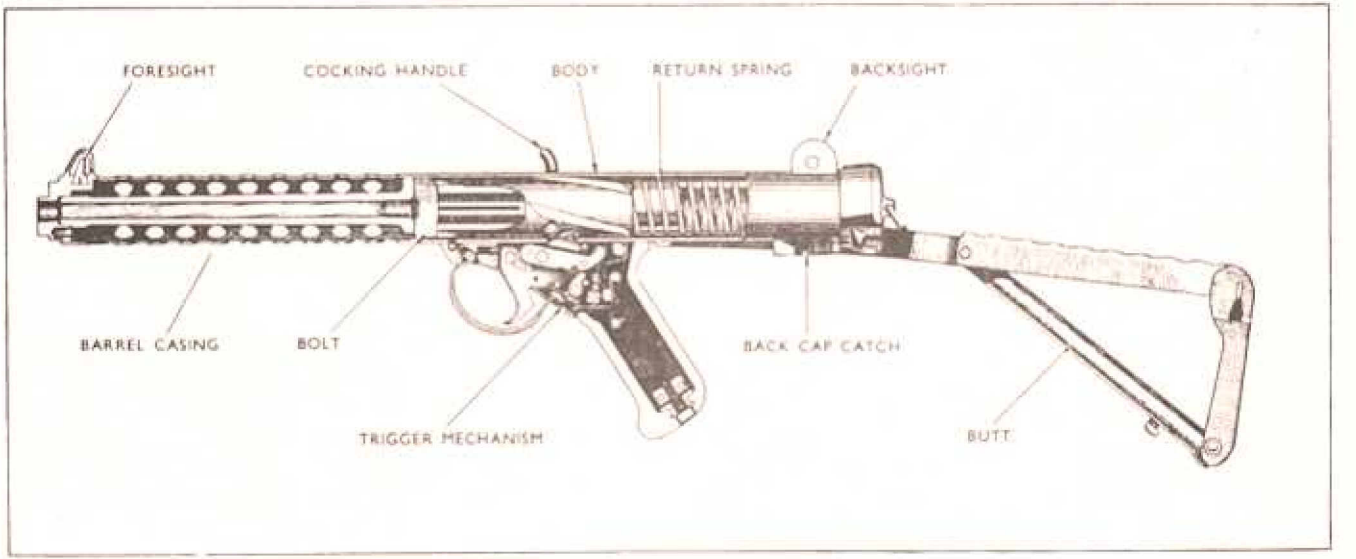


Fig. 1. Sectional arrangement

4.1 THE BACKWARD ACTION (*Fig. 2*). When the cartridge is fired the propellant gases exert an equal pressure against both the bullet and the cartridge case, the latter being supported by the bolt and the compression of the return spring. The gas pressure accelerates the bullet also the cartridge case and bolt in opposite directions and as the weight of the bullet is considerably less than that of the combined weight of the cartridge case and bolt, the bullet attains a much greater velocity than that of the cartridge case and bolt. When the bullet clears the muzzle all have reached their maximum velocities but the cartridge case has not yet cleared from the chamber, thus preventing the gases escaping from the breech. The cartridge case does not clear the breech until the gases behind the bullet have dispersed into the air, ensuring that pressures are down to safe limits before the breech is unsealed.

The bolt is now being decelerated by the compression of the return spring.

The empty cartridge case, held against the face of the bolt by the extractor, is carried back until it strikes the ejector and is ejected through the opening on the right side of the weapon.

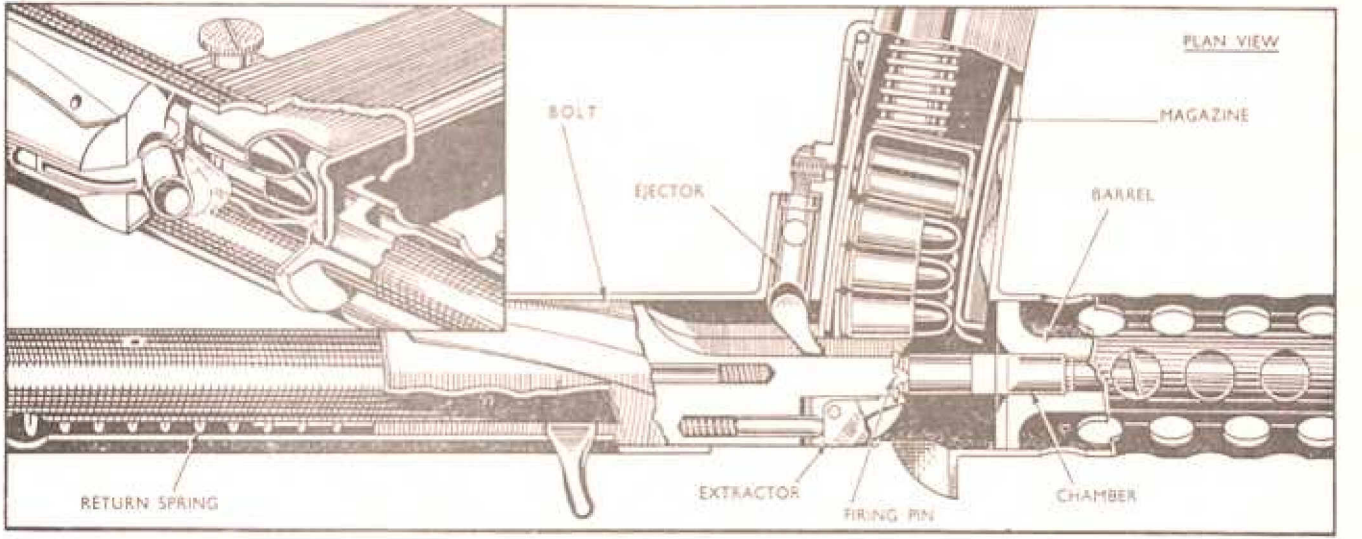


Fig. 2. Backward action

4.2 THE FORWARD ACTION (*Fig. 3*).

When the bolt reaches the limit of its backward travel it is forced forward by the compression of the return spring. During its forward travel the bolt contacts the top round in the magazine and, guided by the magazine lips, the round is fed into the chamber. The bolt then follows up on the round, feeds it into the chamber, and fires it *just* before the forward movement ceases. During the forward movement of the round from the magazine, the firing pin of the bolt cannot come into line with the percussion cap of the cartridge until the round is actually in the chamber. This provides the mechanical safety for this type of weapon. Upon firing, the backward action again commences.

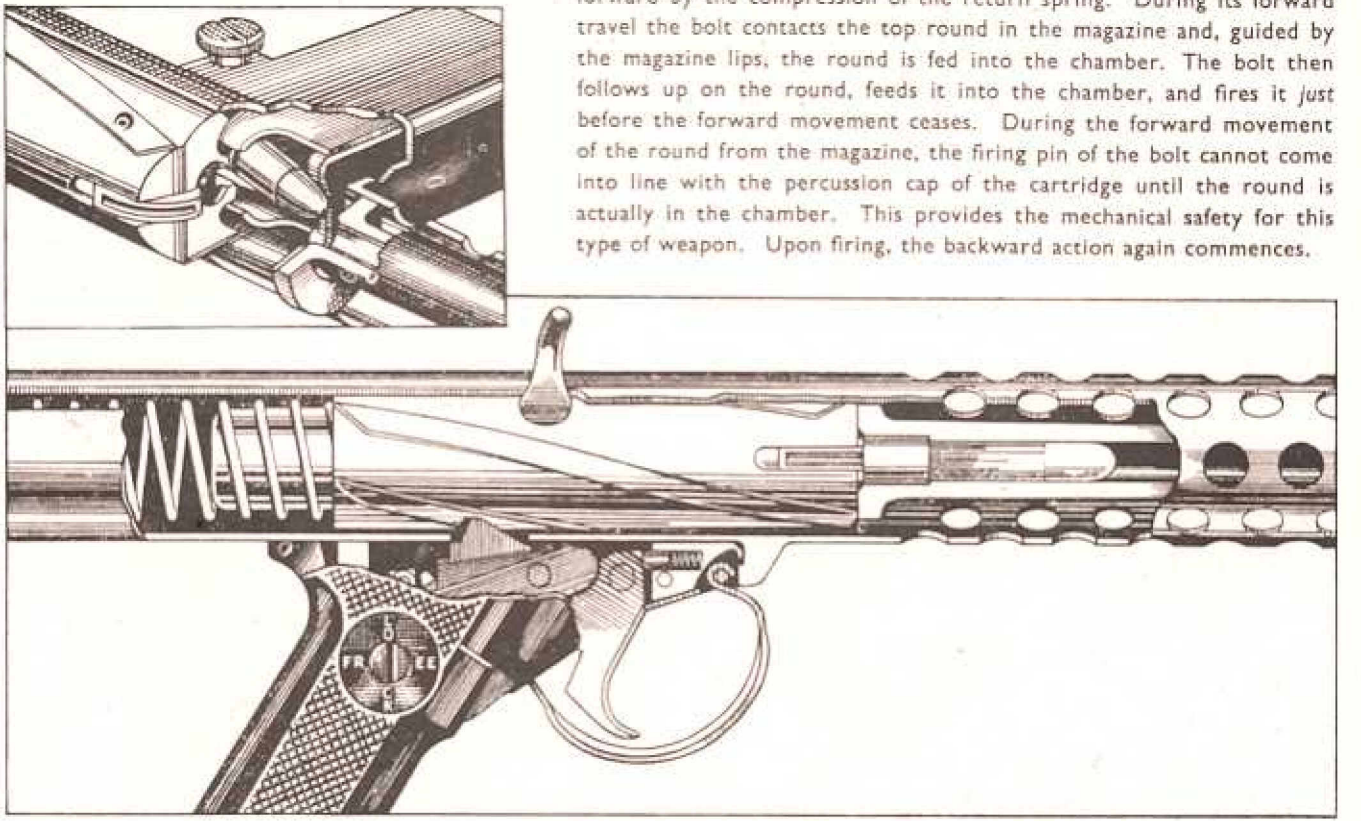


Fig . 3. Forward action

5.0 ACTION OF THE TRIGGER MECHANISM *(Figs. 4, 5, 6 and 7).*

5.1 SINGLE SHOT FIRE *(Figs. 4 and 5).* When the change lever (1) is set to the single shot position R, the inner arm of the change lever is located under the tail of the tripping lever (2).

When with the weapon cocked, the trigger (3) is pressed, the sear cradle (4) is rotated about the sear axis pin (5), the sear (6) is lowered and the bolt is carried forward by the pressure from return spring. During this movement the tail of the tripping lever contacts the inner arm of the change lever causing the tripping lever partially to rotate. Continued pressure on the trigger causes further rotation of the tripping lever until the upper arm disengages from the step on the sear. At the same time the sear plunger and spring (7) are compressed.

When the round is fired, the sear is held down by contact with the under surface of the bolt, but as the bolt reaches the end of its rearward movement and is clear of the sear, the sear is forced upward by pressure of the sear plunger and spring. Then as the bolt is moving forward, the sear engages against the bent on the face of the bolt and holds the bolt in the cocked position.

When the pressure on the trigger is released, the rear end of the cradle rises, lifting the tripping lever and causing it to rotate about its axis pin until the upper arm of the tripping lever re-engages on the step of the sear.

The trigger must be fully released and again pressed for each single-shot.

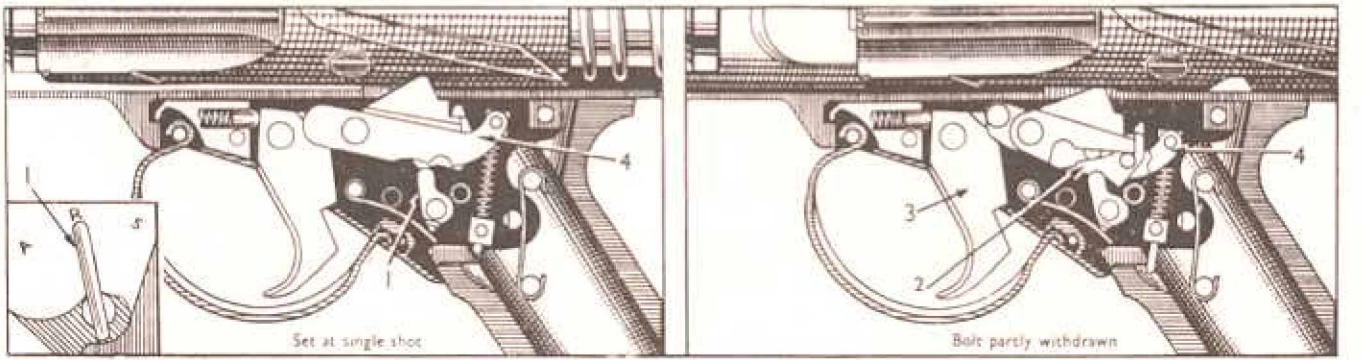


Fig. 4. Action of trigger mechanism (single shot fire)

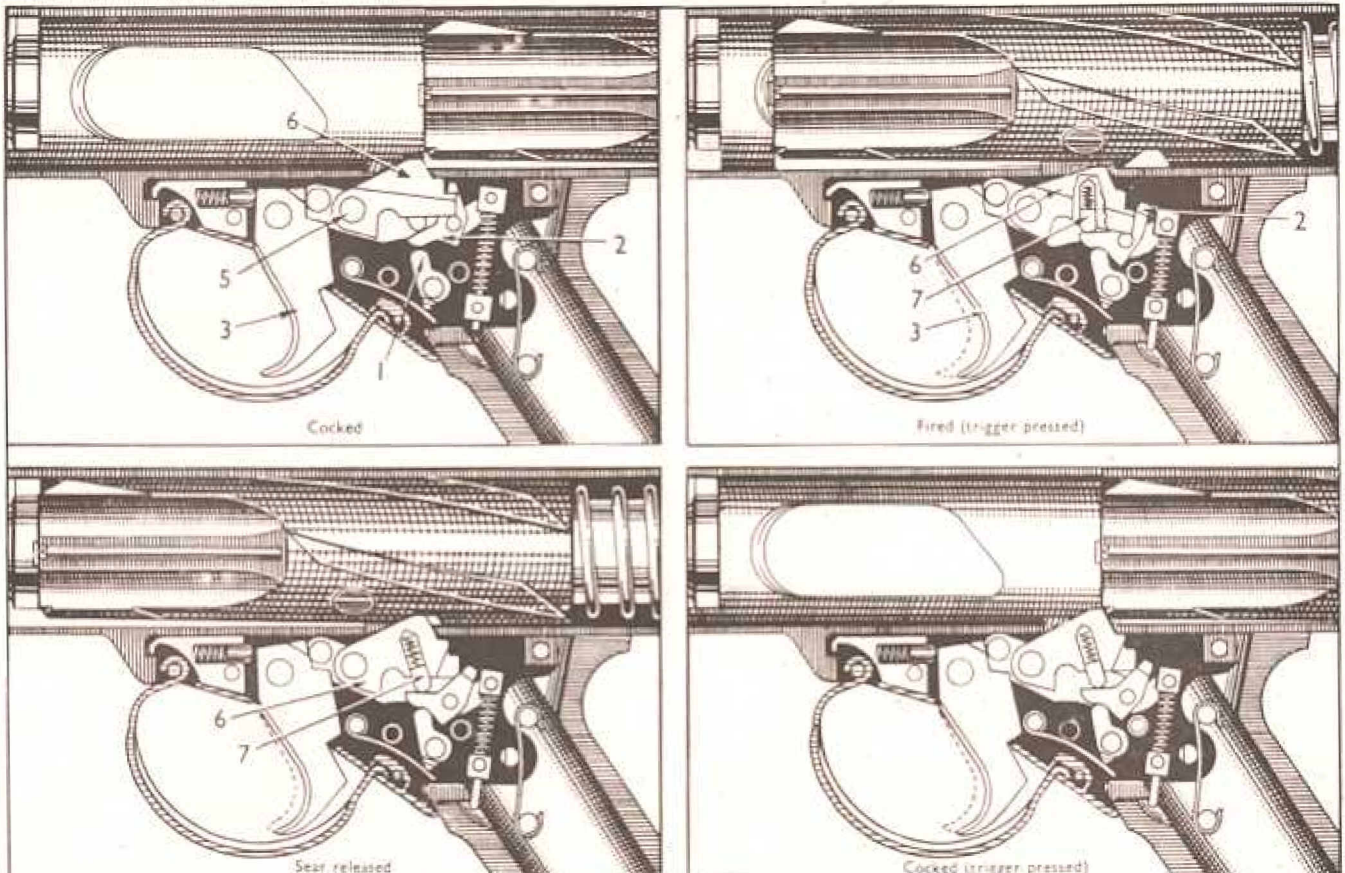


Fig. 5. Action of trigger mechanism (single shot fire)

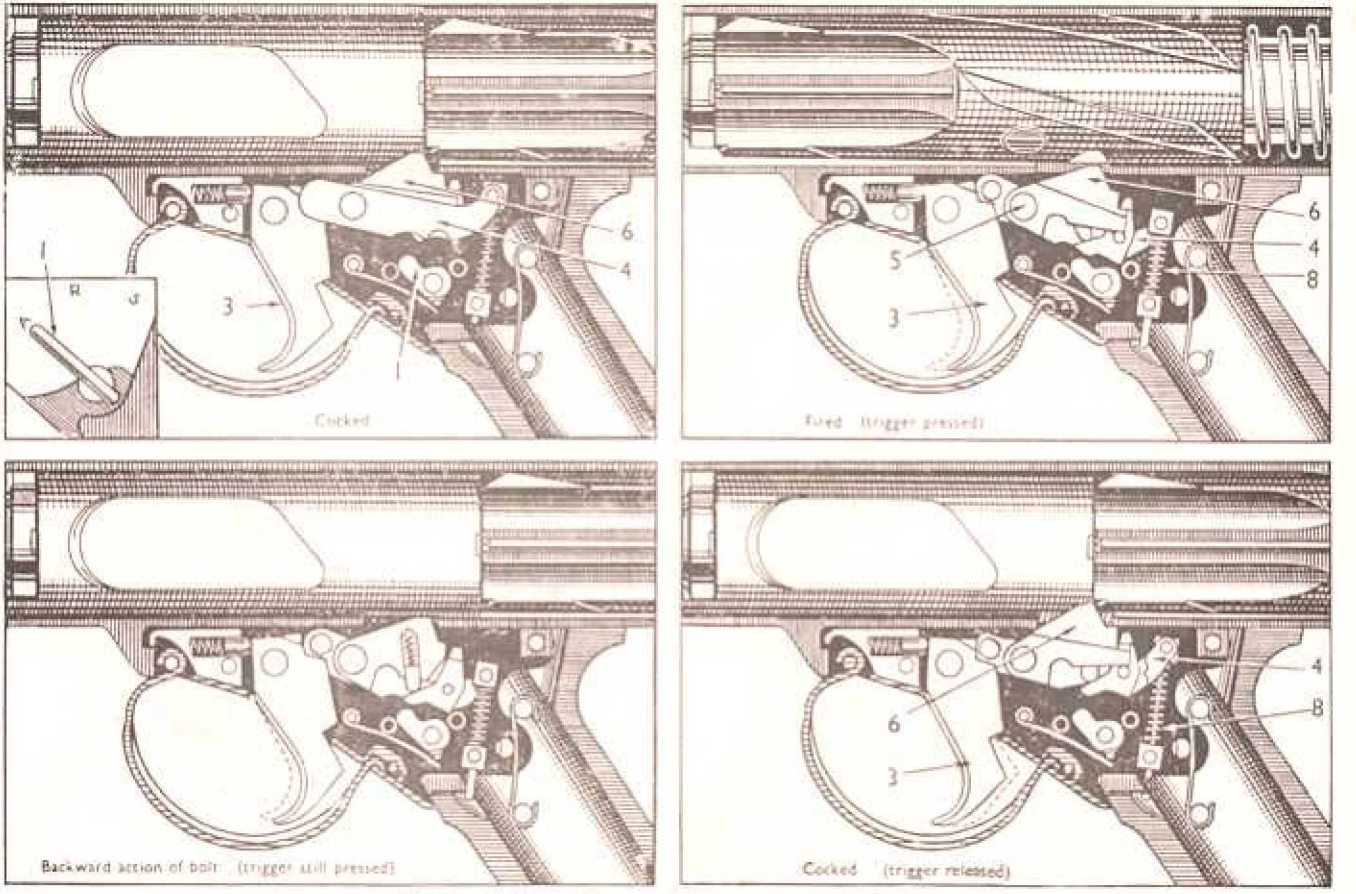


Fig. 6. Action of trigger mechanism (automatic fire)

5 2 AUTOMATIC FIRE (*Fig.* 6). When with the change lever (1) set at automatic A and the weapon cocked, the trigger is pressed, the projection on the upper part of the trigger lifts the end of the sear cradle (4) rotating it about its axis pin (5). This depresses the sear (6) freeing it from contact with the face of the bent on the bolt, and allowing the bolt to fly forward. The movement of the sear cradle compresses the sear cradle spring (8).

The weapon will now continue firing until either the trigger is released or the magazine is empty.

When the trigger is released the sear cradle returns to its former position under the action of the sear cradle spring, the sear is raised into the boltway and contacting the bent on the bolt, holds the bolt in the cocked position.

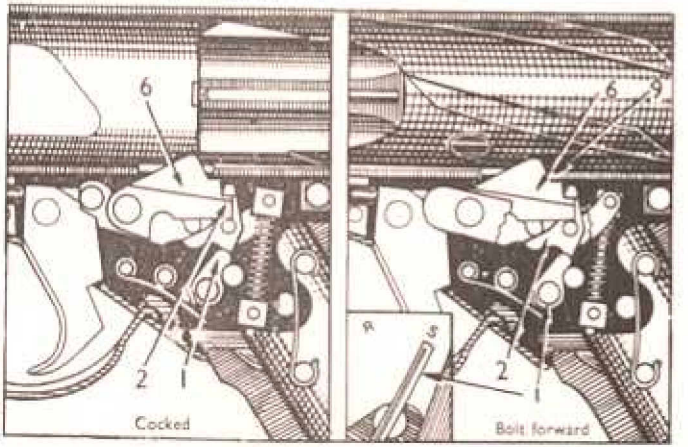


Fig. 7. Applied Safety

5.3 APPLIED SAFETY (*Fig.* 7, Cocked). When with the weapon cocked, the change lever (1) is set at safe S the inner arm of the change lever is positioned directly under the short arm of the tripping lever (2). When the trigger is pressed the sear cradle and sear (6) cannot be depressed because the short arm of the tripping lever is held immovable by the inner arm of the change lever.

(*Fig.* 7, Bolt forward). When with the bolt forward, the change lever (1) set at safe S, the weapon cannot be cocked because the sear (6) is engaged in the safety slot (9) at the rear of the bolt, and the sear cannot be depressed because it is held immovable as described in previous paragraph.

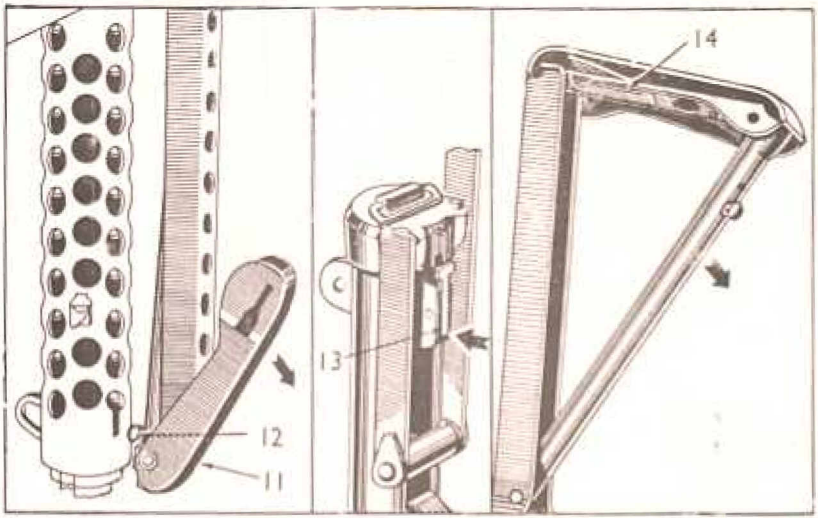


Fig. 8. To open butt

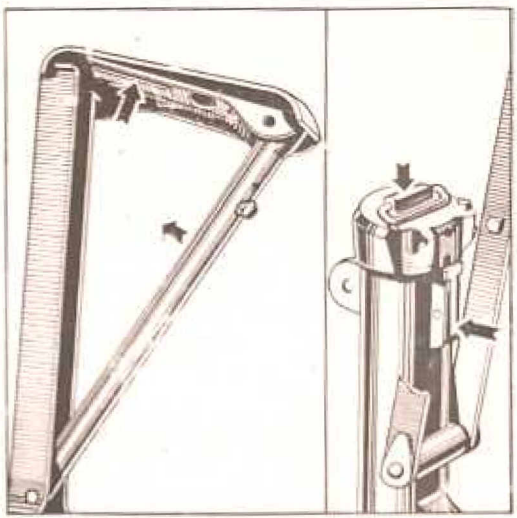


Fig. 9. To close butt

6.0 TO OPEN BUTT (*Fig.* 8). Hold the weapon with the left hand near the backsight with the barrel pointing towards the ground. Pull the butt plate (11) outwards with the right hand to release the butt catch (12) and swing the butt to the rear of the weapon. With the thumb of the left hand press the back cap catch (13) and snap the butt into engagement with the lugs on the back cap. Open the butt frame to form a triangle and the butt plate catch (14) will engage to lock.

7.0 TO CLOSE BUTT (*Fig.* 9). Release the butt plate catch and collapse the triangle by pushing the tubular member into the frame. With the thumb of the left hand press the back cap catch, at the same time push the back cap forward and swing the butt away from the back cap. Pivot the butt to its folded position, swing the butt plate out to operate the butt catch to engage in the barrel casing, then fold the butt plate flat to lock in position.

SECTION 3—STRIPPING AND ASSEMBLING

8.0 ELEMENTARY STRIPPING AND ASSEMBLING (*Figs. 10 and 11*). Before stripping, ensure that the weapon is not loaded and remove sling if fitted. Set change lever to A, place butt in the folded position and bolt forward.

8.1 TO REMOVE RETURN SPRING AND BOLT. Press back cap catch (13) to full depth. Push back cap (15) forward and rotate anti-clockwise until locking lugs disengage from locking recesses. Remove back cap and draw cocking handle to rear of weapon. Lift cocking handle outwards and withdraw return spring assembly (16) from rear of body. Remove bolt from rear of body. Re-assemble in reverse order. The spring-loaded fouling pin will prevent mis-assembly since the cocking handle cannot be inserted until this pin is pushed forward by the centre pin on the spring assembly. This ensures that the cocking handle must pass through the hole in the centre pin.

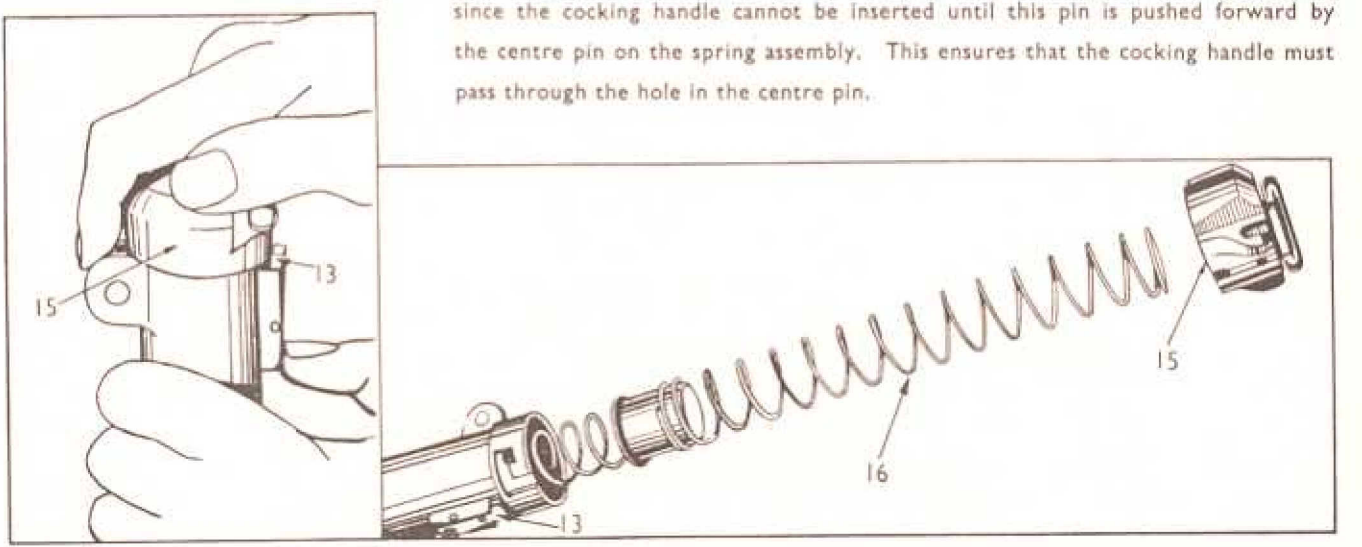


Fig. 10. To remove return spring and bolt

8.2 TO REMOVE TRIGGER GROUP (*Fig.* 11). Set change lever at " Safe ", and with a small coin or rim of a cartridge turn the slot in the head of the trigger group retaining pin (17) in line with the word " Free " on the right side of the pistol grip. With the nose of a bullet or the blunt end of the cocking handle push trigger group retaining pin out and remove. Pull trigger group towards rear of weapon, disengage from step in underside of barrel case and swing front of trigger group out and remove from body. To remove trigger guard, push out forward pin, swing guard downward, pivoting about its rear fixing, and unhook from underplate.

NOTE.—Elementary stripping does not include any further stripping of trigger group.

8.3 ASSEMBLY. Assemble in the reverse order of stripping.

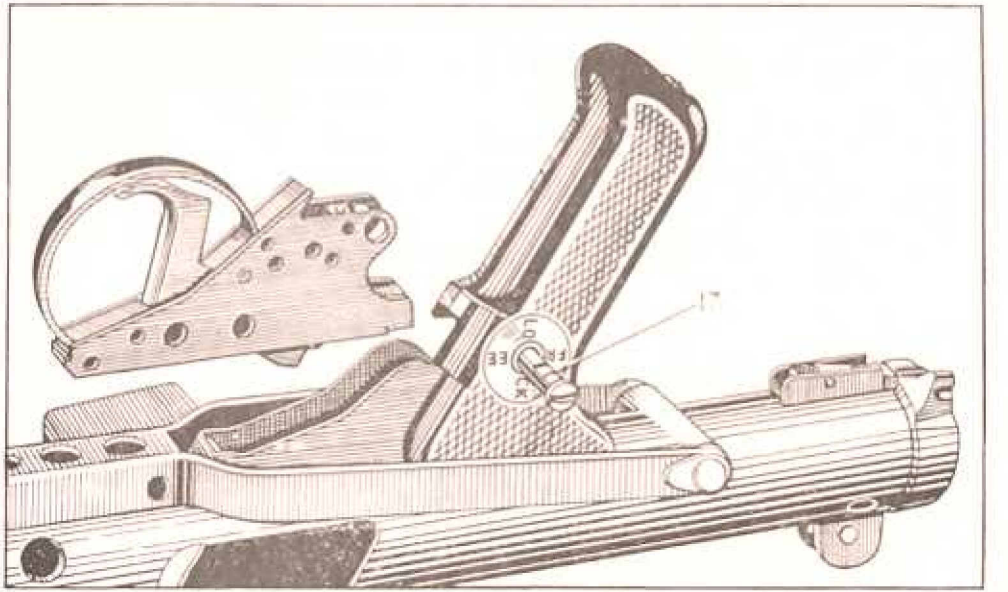


Fig. 11. To remove trigger group

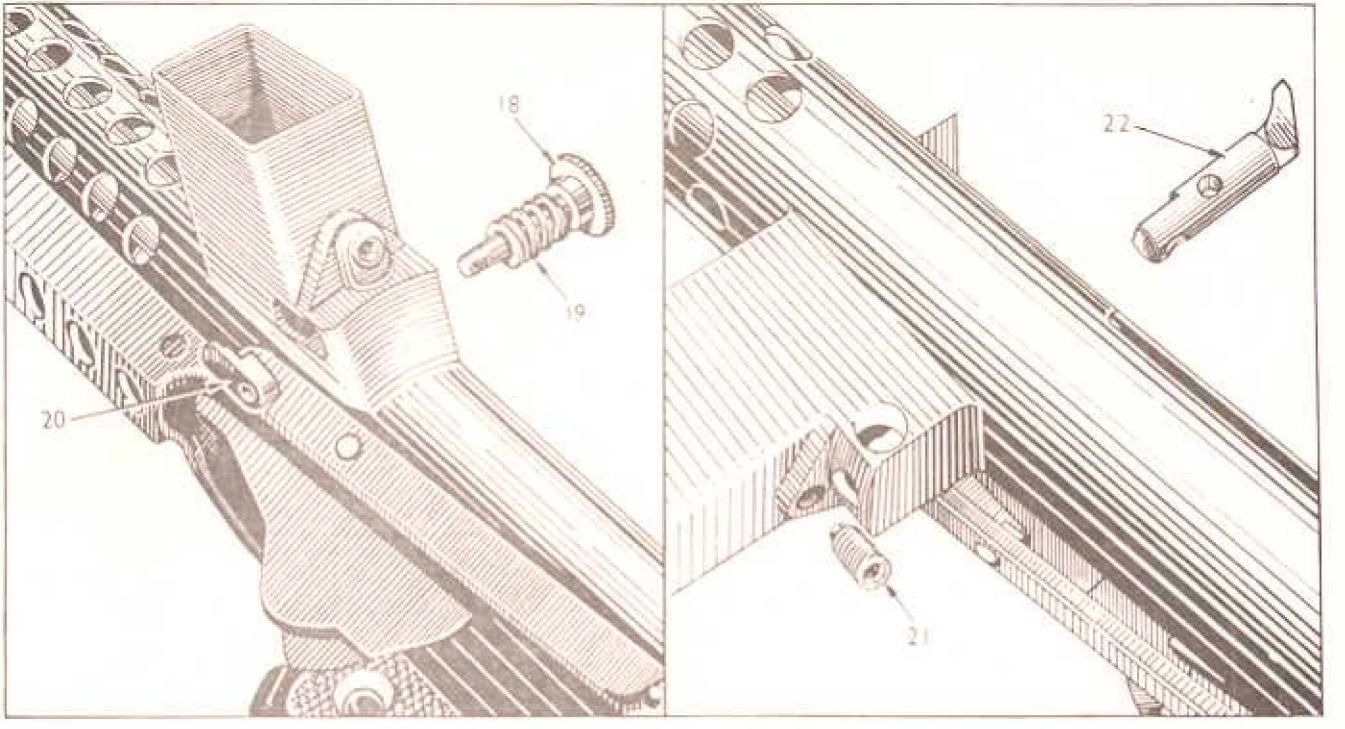


Fig. 12. To remove ejector

9.0 ADVANCED STRIPPING AND ASSEMBLY (*Figs. 12, 13, 14, 15 and 16*). **STRIPPING.**

NOTE.—This should only be carried out by a qualified armourer when it is required to replace worn or broken parts, or by a qualified instructor, when it is required to give instruction on the mechanism and operation of the weapon. Commence by carrying out elementary stripping.

9.1 TO REMOVE EJECTOR (*Fig. 12*). Using large screwdriver unscrew magazine catch screw (18), remove spring (19) and magazine catch (20). Using $\frac{1}{8}$" Allen key remove ejector retaining screw (21). Tap out ejector (22) and remove through ejection opening in the body

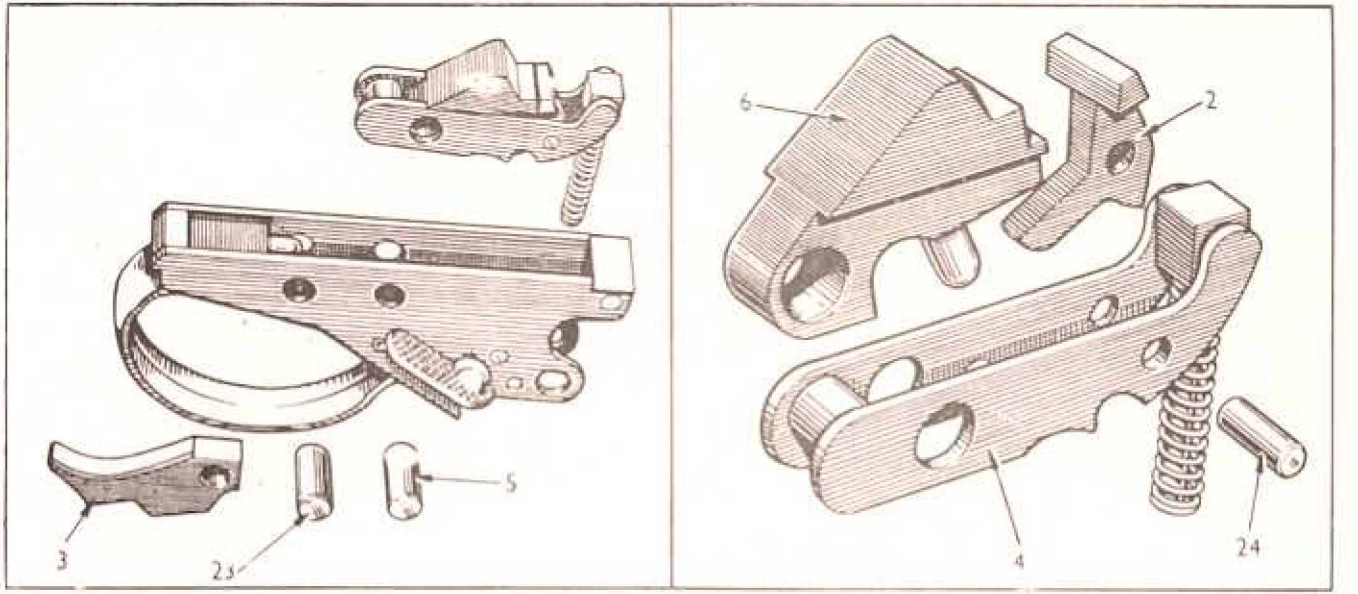


Fig. 13. To strip trigger group

9.2 TO STRIP TRIGGER GROUP (*Fig.* 13). Push out sear axis pin (5) and lift out sear group from trigger group. Push out trigger axis pin (23) and remove trigger (3) downwards through trigger guard.

Push out tripping lever axis pin (24) and lift tripping lever (2) from sear cradle (4) and lift sear (6) from sear cradle.

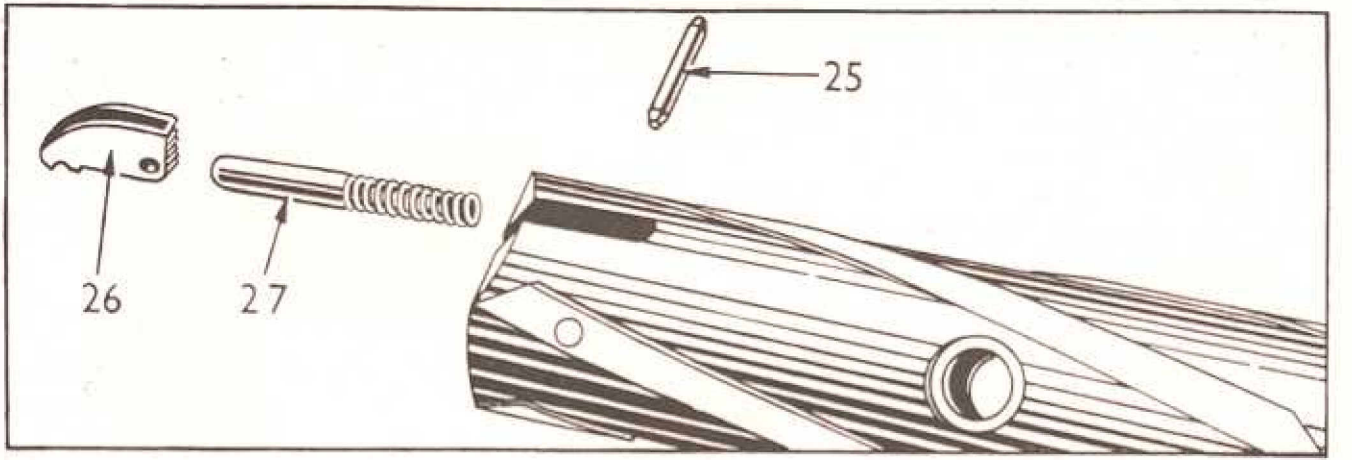


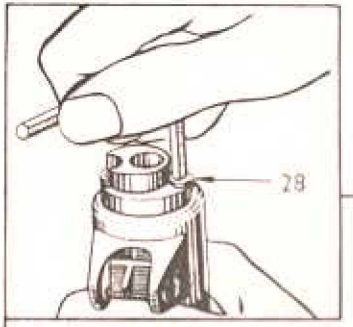
Fig. 14. To remove extractor

9.3 TO REMOVE EXTRACTOR (*Fig.* 14). Push out extractor retaining pin (25) and remove extractor (26). During this operation hold extractor with thumb or forefinger otherwise it may shoot out. Remove extractor plunger and spring (27).

Assemble in reverse order.

9.4 TO REMOVE PISTOL GRIP. Unscrew grip retaining screw using $\frac{3}{16}$" Allen key. Withdraw grip.

Assemble in reverse order.



9.5 TO REMOVE BARREL (*Fig.* 15). Partially unscrew the two barrel retaining screws (28) as shown using $\frac{7}{16}$" Allen key. Protect these with a piece of wood and using a mallet drive barrel back from its seating. Remove screws and rotate barrel (29) to clear bayonet lug and withdraw from body.

9.6 TO STRIP MAGAZINE (*Fig.* 16). Depress stud protruding through bottom plate (30) and slide plate from magazine case, controlling the magazine spring with hand

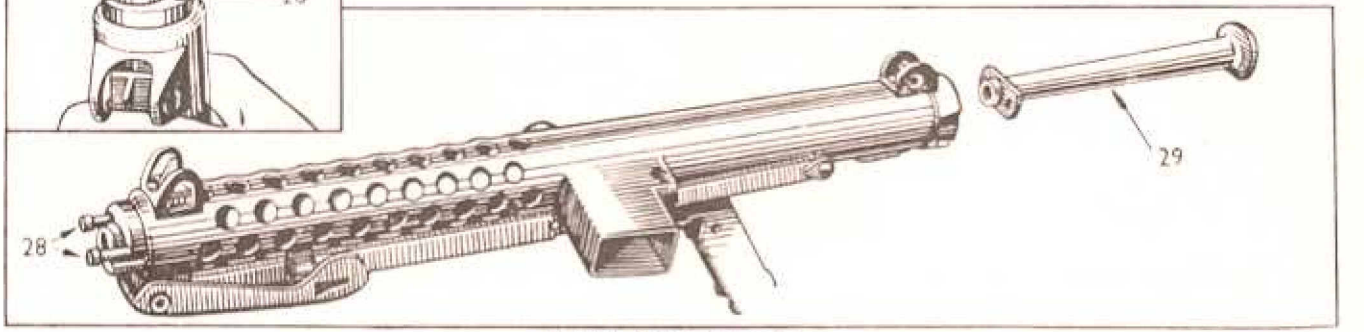


Fig. 15. To remove barrel

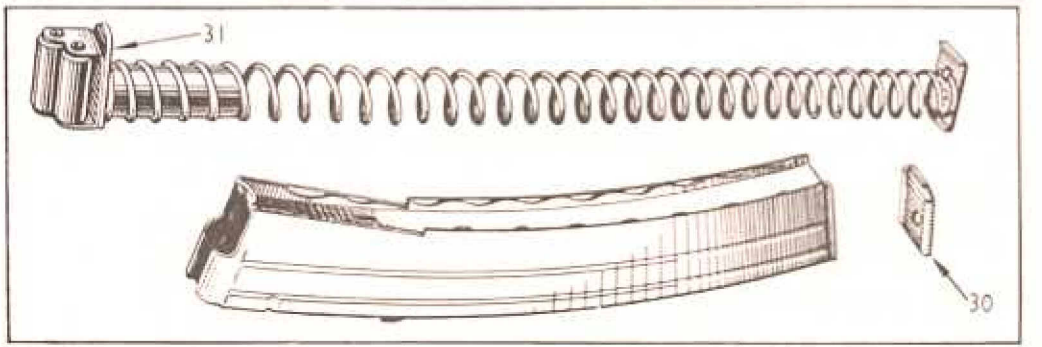


Fig. 16. To strip magazine

to prevent it flying free. Withdraw platform and spring assembly (31) rocking platform at bottom of magazine case to clear indentations.

9.7 FORESIGHT. The foresight fits into a dovetail in the barrel case. It is a spring fit, there being no retaining pin or screw. To remove, tap right out from either side with a drift.

9.8 BACKSIGHT. This should not be removed unless absolutely necessary.

To remove the backsight, drive out the pin, lift out sight and spring, taking care not to lose small collars.

ASSEMBLY

9.9 TRIGGER GROUP.

9.9.1 Ensure change lever is at automatic A.

9.9.2 Replace tripping lever and its axis pin in sear cradle, ensuring that the head of the tripping lever is engaged on the lower step of the sear.

9.9.3 Insert sear group into trigger group housing. Line up the sear, sear cradle and trigger housing, using trigger group retaining pin as a drift, and replace sear axis pin.

9.9.4 Insert trigger upwards through trigger guard ensuring that the trigger plunger is depressed within its housing. Line up, using trigger group retaining pin as a drift, and replace trigger axis pin.

9.9.5 Test trigger group for correct functioning at safe, single-shot and automatic.

9.10 BARREL.

9.10.1 Insert barrel into case and push forward, rotating the barrel to clear bayonet lug. The extractor clearance groove in the barrel face should be in line with the ejector opening.

9.10.2 Replace barrel retaining screws hand tight, then finally tighten, a little on each screw at a time using Allen key.

9.11 FORESIGHT. To assemble, insert foresight into dovetail and tap into the required position.

9.12 **BACKSIGHT.** Place spring and sight in housing, line up and insert pin. Insert collars and peen ends of pin over into countersinks in collars.

9.13 **MAGAZINE.** Feed platform and spring into magazine casing, rocking past the indentations—the upper roller is on the left side when viewed from the rear of the magazine. Compress spring into casing and slide on bottom plate, engaging the stud in its hole in bottom plate.

SECTION 4—ZEROING

10.0 The weapon is zeroed before issue to the user and should require little attention other than correction for line, or direction. This is effected by tapping the foresight to left or right. The foresight is a spring fit in its seating and requires no securing screw.

10.1 Vertical zeroing is effected by loosening the 4 BA grub screw securing the blade (4 turns) with a $\frac{1}{8}$" Allen key and rotating the blade in or out as required, one or more full turns. The grub screw must be tightened to relock. One turn of the blade gives a variation of M.P.I. of $5\frac{1}{2}$ inches at 100 yards.

10.2 The weapon may be zeroed at either 100 yards or 100 feet. For 100 yards the Mean Point of Impact should be on sight line. For 100 feet M.P.I. should be 2 inches above sight line.

SECTION 5—CLEANING

11.0 Carry out elementary stripping. Clean the bore of the barrel using a pull-through and flannelette size 4 inches x 3 inches. When the bore is clean, oil it, using flannelette size 4 inches x 2 inches. Clean and oil the chamber using a piece of stick with flannelette on it. Clean the remaining parts of the weapon with an oily rag. Particular attention being paid to the oiling of the face of the bolt, inside the bolt run and to the ejector.

11.1 Magazines should be cleaned with an oily rag. Ensure that the platform is easy to move inside the magazine case.

BRIEF HISTORY OF SUBMACHINE GUNS AND CARBINES

Sterling

The business of Sterling Engineering began at the turn of the century. In the mid 1940's the Company was involved in the development of a lightweight infantry mortar with the Ministry of Defence. In 1939 the Lanchester machine carbine, which was based on the German MP 28 11, was designed by G.H. Lanchester, of the Sterling Engineering Company. Over 100,000 of these weapons were manufactured and supplied to the Royal Navy and British Commonwealth Navies. The Company also manufactured the De Lisle silent carbine which was in action in resistance forces in Europe within 24 hours of the first weapon being produced. The Company also manufactured components for other weapons.

Patchett

Design work proceeded during the War to achieve a lighter, more accurate, compact and completely reliable weapon. Extensive work by Sterling's design team under G.W. Patchett resulted in the Patchett Sub Machine Gun. Limited quantities saw service in Europe shortly before the end of World War II.
After the War, further development and improvements were made and, after a series of competitive trials held by the British Government, its was adopted as the standard weapon for HM Forces as the Sub Machine Gun 9mm L2A3 in 1954.
L2A1 and L2A2 were earlier versions made in limited quantities between 1951 and 1953. With the adoption by the British Forces the weapon became known as the Sterling.

Sterling Mark 4 (L2A3)

With the adoption of the weapon by the British Forces, production was increased and the weapon has been supplied, and is still being supplied, to the Armed and Police Forces of over 90 countries in the free world. More than 2 million Mark 4's have been made. The design of the Sterling Mark 4 (L2A3) has not been changed in any marked degree since its introduction and current spare parts will fit any Mark 4 ever made. Improvements have been made regularly in production techniques and many components are now made from extruded section material or precision castings but interchangeability of all components has remained unaltered.

Sterling Mark 5 (L34A1)

A British General Staff requirement for a weapon of single shot and full automatic capability that met the standard of "mechanical noise to be unheard at 30 metres and not to be recognised as a firearm at 50 metres" was expressed in the '60s. Research and design were undertaken by G.W. Patchett who met the requirements for this weapon based on the SMG L2A3. After extensive trials an order was placed by the British Government and, in collaboration with G.W. Patchett, Sterling undertook the manufacture of the SMG 9mm L34A1 (Sterling Patchett SMG 9mm Mark 5 – Silenced).
The method of silencing is described in our literature. It should be emphasised that to have an effectively silenced weapon the bullet must be subsonic, otherwise there remains the "crack" of the bullet as it passed through the air which immediately discloses the presence of the firer and that of a firearm. The Sterling Patchett is a truly silenced firearm, not merely sound moderated or suppressed.
The Mark 5 has now become available for sale to friendly Governments along with the Mark 4 which, of course, continues in product as the proven standard Sub Machine Gun.

Sterling Mark 6 Semi-Automatic Carbines

The Mark 6 is identical in appearance to the Sterling Submachine Gun Mark 4 except that the barrel has been lengthened to conform with U.S. Regulations and the weapon is capable of semi-automatic fire only. The weapon is primarily designed to meet the demand of U.S. civilian enthusiasts.

Sterling Para Pistol Mark 7

This is a special compact version of the standard Mark 4 Submachine Gun. The Para Pistol range was developed and put into production in late 1983 by the Works Director, Mr. D.T.E. Howroyd. The Mark 7 is designed for vehicles, special units, pilots, and crews' personal weapons where confined space limits the storage of standard Submachine Guns. The Mark 7 gives the same fire power and characteristics as a full length Submachine Gun. The weapon comes in four different modes, the Military versions A4 and A8 which fire from the open bolt and have the capability of firing single shot or automatic rapid fire. A4 denotes a 4" barrel and A8 denotes a 7.8" barrel length. A suppressor/silencer is available for the A4 unit. The Police versions are designated C4 and C8. The C series fires from a closed bolt and has a floating firing pin. All closed bolt units fire in the single shot mode only. All C series guns have two locating buttons on the upper side of the gun casing to enable a dovetail scope rail to be fitted. The buttons are ready drilled and tapped and the Sterling scope rail fits on them direct. This rail will take most known makes of night and optical sights.

Sterling Carbine Mark 8

The Sterling Mark 8 Carbine 9mm is a closed bolt firing weapon designed specifically for Police usage where rifle-like accuracy is demanded and yet the use of pistol ammunition obviates some of the normal disadvantages associated with high velocity ammuntion in such a role. It is capable of semi-automatic fire only. All weapons have two Locating Buttons on the upperside of the gun casing to enable the dovetailed scope rail to be fitted.

Comparative reference numbers and nomenclature

Manufacturer's Reference	*British Government Reference*
Patchett (Sterling SMG 9 mm Mark 1)	SMG Patchet 9 mm
Sterling SMG 9 mm Mark 2	SMG 9 mm L2A1
Sterling SMG 9 mm Mark 3	SMG 9 mm L2A2
Sterling SMG 9 mm Mark 4	SMG 9 mm L2A3
Sterling Patchett SMG 9 mm Mark 5	SMG 9 mm L34A1
Sterling Carbine 9 mm Mark 6	N/A
Sterling Para Pistol 9 mm Mark 7 A4 and A8	N/A
Sterling Pistol 9 mm Mark 7 C4 and C8	N/A
Sterling Carbine 9 mm Mark 8	N/A

Tests and Trials

Extensive tests were carried out by the British Authorities before adopting the Sterling and the Sterling Patchett. These are referred to in some of the literature.

In the case of the standard weapon, these involved immersion in mud, sandstorm and Arctic conditions and its reliability and continued functioning under such adverse conditions, allied to its compactness, strength and exceptional accuracy compared with its competitors from many countries led to its adoption. Endurance trials were discontinued after 10,000 rounds as the weapons showed no loss of accuracy and there was "no measurable wear".

Similar tests were carried out on the silent weapon with equally good results, with if anything, even more accuracy, due to the longer sight base.

Research and development continue.

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